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(54) **COMPOSITION FOR THE FABRICATION OF SILICATE PLATES**

(57) The composition consists in dry weight of silica (40-50%), cement (20-35%), sand (5-10%), and cellulose fibres (5-9%), optionally with one or more water-proofing agents and/or agents to increase the dimensional stability of the plate. This composition is suitable

for manufacturing silicate plates which can be used as base for construction or decoration materials in construction work, such as in pavements, murals and roofing.

## Description

**OBJECT OF THE INVENTION**

[0001] The present invention relates to a composition for manufacturing silicate plates which can be used as base for construction materials or decorative materials in construction work, such as in pavements, murals and roofing. The invention also relates to such silicate plates and to their manufacturing process.

**BACKGROUND OF THE INVENTION**

[0002] The use of bases meant to receive other construction or decoration materials, such as brick, tiles, floor tiles, etc. in order to build murals pavements or roofing is well known in the construction industry.

[0003] The composition of these bases can vary considerably, depending on the material to be supported, such as plaster, cement, mortar, etc. Likewise, their shape can also be quite varied although of late plates of suitable sizes and finishings predominate.

[0004] Bases used for construction must fulfill certain important properties, among which are that the base material have good adhesive properties to the material which is to be deposited. In addition, it would be advantageous for the material of these bases to have a coefficient of expansion similar to that of the construction or decoration material which will be deposited on it.

[0005] Although many bases are used in construction composed of several different materials meant to receive other materials, the construction industry still demands new materials which may be used for bases which provide a suitable base to receive other construction or decoration materials, which have the above described properties. Use of such bases would allow to reduce the thickness of the construction or decorative material to be used, resulting in reduced expenses for material and its transport while carrying out a similar constructive or ornamental task.

[0006] The invention provides a solution to the existing problem which consists of developing a suitable composition for manufacturing silicate plates which may be used as a base for construction or decoration materials in construction work. The invention also relates to such silicate plates and their manufacturing process.

**DETAILED DESCRIPTION OF THE INVENTION**

[0007] The invention provides a suitable composition for manufacturing silicate plates which may be used as a base for construction or decoration materials in construction work, hereinafter 'composition of the invention', which comprises:

Component	% weight of total
Silica	40-50

(continued)

Component	% weight of total
Cement	20-35
Sand	5-10
Cellulose fibre	4-8

[0008] All these components are known and can be easily found in the market.

[0009] The silica preferably has a specific surface area between 3,000 and 4,000 cm<sup>2</sup>/g.

[0010] The cement, which can be Portland cement, preferably has a specific surface area between 2,500 and 3,500 cm<sup>2</sup>/g.

[0011] Although any sand normally used in construction may be employed, it is best to use silicate sand with an average grain size between 80 and 100 micrometers (μm).

[0012] The cellulose fibres can in general result from a Kraft wood treatment process of e.g. pine, eucalyptus, etc. In the specific embodiment of this invention cellulose fibres result from pine and eucalyptus in a pine: eucalyptus weight ratio of 2/3:1/3.

[0013] The composition of the invention may also contain several additives which help to improve the processability of the composition of the invention or the properties of the plate which may be obtained, such as waterproofing agents and agents which increase the dimensional stability of the plate.

[0014] As a waterproofing agent may be used any organic or inorganic waterproofing agents and their mixtures, generally used in construction, such as sodium and potassium silicate, stearates such as calcium stearates, etc. If the composition of the invention includes a waterproofing agent this may be present in it in an amount between 2% and 4% by weight with respect to the total weight of the composition.

[0015] As a dimensional stability adding agent can be used any compound which can reduce the humidity of the composition of the invention and the resulting plate, such as alumina, kaolin, etc. and their mixtures. The composition of the invention may include one or more agents to increase the dimensional stability of the plate, in which case each agent may be present in the composition of the invention in an amount between 0% and 6% with respect to the total weight of the composition.

[0016] The composition of the invention may be easily obtained by mixing the different components in the right proportions.

[0017] The composition of the invention is suitable for creating a silicate plate, hereinafter silicate plate of the invention, which may be used as a base for construction or decoration materials in construction work. The silicate plate of the invention may be easily manufactured in a Hatschek type machine.

[0018] Therefore, the silicate plate of the invention can be obtained by a process which comprises:

a) giving shape to the plate from an aqueous paste of a mixture which includes the composition of the invention, i.e., it consists in dry weight of 40-50% silica, 20-35% cement, 5-10% sand, and 4-8% cellulose fibres optionally, as well as one or more waterproofing agents and/or agents which increase the dimensional stability of the plate.

b) compressing the shaped plate in a press in order to reduce its thickness and increase its density.

c) removing the shaped plate from such press and

d) carrying out a curing process on this plate in an autoclave.

[0019] The silicate plate of the invention may be formed as a flat plate, although if desired it can be made in any other shape, such as a corrugated one.

[0020] During the curing process in an autoclave of the formed plate a reaction takes place between the components, particularly between the silica and the cement, forming a bonding die. The cement acts as an agglomerant, the silica as a reactant in the autoclave to generate calcium silicates, the cellulose fibres act as reinforcement material and fibre to form the plate in the Hatschek machine and the sand is meant to reduce the humidification movement of the product, which helps increase the dimensional stability of the plate. This increase in the dimensional stability may be improved by adding a suitable agent such as alumina, kaolin or their mixtures. The kaolin also improves processability in the Hatschek machine and helps waterproofing of the product. This goal may be improved by incorporating to the composition one or more waterproofing agents.

[0021] The silicate plates of the invention, obtained by the above described procedure, constitute a further object of this invention.

[0022] A silicate plate representative of the invention has among other properties the following: density higher than 1.5 kg/dm<sup>3</sup>, a resistance to pressure above 10MPa (megapascals) and a dimensional variation between the dry and saturated states on the order of 0.3%.

[0023] The silicate plate of the invention is suitable for use in construction, particularly as a support material for receiving construction or decorative materials such as tiles, floor tiles, bricks, marble, stone, etc. in order to build pavements, murals and roofing.

#### PREFERRED EMBODIMENT

[0024] As indicated in the detailed description the cellulose fibres are from pine and eucalyptus from a Kraft process, the remainder is silica, Portland cement, silicate sand with an average grain size between 80 and 100 micrometers (μm); equal proportions of sodium and potassium silicate as waterproofing agents, as stabilising agents kaolin and finally alumina in a proportion

three times that of the kaolin.

[0025] The composition in percentage weight with respect to total weight is the following:

Component	%weight with respect to total
Pine fibre	4
Eucalyptus fibre	2
Silica	50
Cement	20
Sand	10
Kaolin	6
Silicate	2
Alumina	6

#### Claims

1. A suitable composition for manufacturing silicate plates, which comprises:

Component	% weight of total
Silica	40-50
Cement	20-35
Sand	5-10
Cellulose fibre	4-8

2. Composition as in claim 1, in which such silica has a specific surface area between 3,000 and 4,000 cm<sup>2</sup>/g.
3. Composition as in claim 1, in which such cement is a Portland type cement.
4. Composition as in claim 2, in which such cement has a specific surface area between 2,500 and 3,500 cm<sup>2</sup>/g.
5. Composition as in claim 1, in which such sand is a silicate sand with an average grain size of 100 micrometers (μm).
6. Composition as in claim 1, which also includes one or more additives chosen from among waterproofing agents and agents which increase the dimensional stability of the plate.
7. Composition as in claim 6, where said waterproofing agents are chosen from among the group formed by organic waterproofing agents, inorganic waterproofing agents, and their mixtures.
8. Composition as in claim 7, in which said waterproofing agents are chosen from among the group formed by sodium and potassium silicate, calcium stearate and their mixtures.

9. Composition as in claim 8, in which said waterproofing agents are present in the composition in amounts ranging between 2% and 4% by weight with respect to the total composition weight.

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10. Composition as in claim 6, in which said agents which increase the dimensional stability of the plate are chosen from among the group formed by alumina, kaolin and their mixtures.

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11. Composition as in claim 6, in which said agents which increase the dimensional stability of the plate are present in the composition in an amount between 0% and 6% by weight of the total composition weight.

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12. A process for manufacture of a silicate plate which comprises:

- a) shaping said plate from an aqueous paste of a mixture with a composition according to any of claims 1 to 11 in dry weight; 20
- b) compressing the shaped plate in a press in order to reduce its thickness and increase its density. 25
- c) removing the shaped plate from such press and
- d) carrying out a curing process on this plate in an autoclave.

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## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/ES 99/00239

A. CLASSIFICATION OF SUBJECT MATTER		
IPC 7	E04C1/00	C04B22/06 C04B7/00 C04B14/16 C04B26/10
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC 7 E04C C04B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "G" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patendaan 2 NL - 2280 HV Rijswijk Tel: (+31-70) 340-2040, Tx: 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  A. Amaro

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Information on patent family members

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